A comparison between the photographic magnitudes of BELJAWSKY in the zone between + 45° and + 40° and the Bergedorf-Groningen Durchmusterung, by *P. Th. Oosterhoff*.

BELJAWSKY's magnitudes show a considerable colour equation relative to the B.G.D., their effective wavelength being longer. The zeropoint differences vary in an irregular manner between $-^m\cdot14$ and $+^m\cdot52$, but the scales are practically identical.

BELJAWSKY has determined the photographic magnitudes for 8986 stars in the southern half of the A.G. Bonn zone [1]). The plates were taken with the 12 cm Simeis double astrograph and each of them carries two exposures on neighbouring fields and one on the north pole. Although at first the Harvard Polar magnitudes were used, the measures have later been reduced to the international standards. Field corrections, which proved to be rather irregular, have not been applied, but BELJAWSKY has adopted corrections to the zeropoint of different parts of the zone which vary from − ·18 to + ·39 and which he ascribes to variations in the differential extinction. BELJAWSKY has compared his magnitudes with those of the *Henry Draper Catalogue*, but as the latter have been derived from visual magnitudes it seems that more information can be gained from a comparison with the photographic magnitudes of the *Bergedorf-Groningen Durchmusterung*. This comparison leads to the following results.

Uncertain magnitudes and values which are given to one decimal only have not been used. With the omission of a dozen stars for which the difference Be−BG is evidently in error just over a thousand stars are common to both catalogues. First mean values of Be−BG have been computed for different spectral types, the resulting figures being:

S.A.	B,A Δm	n	F,G Δm	n	K,M Δm	n	S.A.	B,A Δm	n	F,G Δm	n	K,M Δm	n
20	+·12	5	−·05	14	−·16	7	32	−·14	2	−·31	14	−·46	5
21	+·23	11	+·04	19	−·05	10	33	−	0	−·02	19	−·22	1
22	+·36	16	+·13	15	−·18	9	34	+·32	2	+·07	21	−·07	3
23	+·49	14	+·25	15	+·13	6	35	+·04	2	+·01	13	−·19	10
24	+·23	29	+·18	20	+·01	9	36	+·01	1	−·26	24	−·27	5
25	−·04	25	−·15	27	−·34	9	37	+·20	12	−·02	27	−·02	11
26	+·12	14	−·07	26	−·02	5	38	+·03	11	−·14	36	−·10	12
27	+·28	6	+·18	23	+·21	6	39	−·16	23	−·30	39	−·48	12
28	−	0	+·24	23	+·10	6	40	+·28	34	−·05	36	−·18	7
29	+·33	5	+·23	24	−·04	6	41	+·21	28	+·10	30	−·18	8
30	−	0	+·23	12	−·06	3	42	+·19	24	+·04	15	−·03	16
31	+·20	2	+·29	17	+·25	5	43	+·01	12	−·05	25	−·09	18

This table clearly indicates that there exists a considerable colour equation and that the zeropoint difference varies from area to area. The following colour corrections have been assumed:

Colour corrections to Be−BG

Bo	− ·09	Go	+ ·18
B5	− ·04	G5	+ ·22
Ao	·00	Ko	+ ·26
A5	+ ·05	K5	+ ·31
Fo	+ ·09	M	+ ·35
F5	+ ·13		

[1]) *Poulkovo Publ.*, Ser. II, Vol. **40**, 1932.

These corrections mean that the effective wavelength of BELJAWSKY's magnitudes is considerably longer than that of the *Bergedorf-Groningen Durchmusterung*. As the colour conception of the latter is the same as that of the international system, the corrections given above should be applied to the magnitudes of BELJAWSKY. He himself came to a similar conclusion from a comparison with the magnitudes of the *Henry Draper Catalogue*. The mean colour index Be−HDvis. for stars of spectral type Ko is only ·7 instead of 1·0. This result is quite remarkable, as the effective wavelength of another photometry [1]), which was carried out by BELJAWSKY with the same instrument in 1915, is slightly shorter than that of the international system, as was shown by SEARES [2]) and by DE SITTER [3]). The origin of this difference in colour conception between the two catalogues of BELJAWSKY is rather puzzling.

The corrections for colour equation having been applied throughout, we have formed for each area the mean difference Be−BG with the omission of stars brighter than 8·5 or fainter than 10·0. In this way the following zeropoint differences have been derived:

S.A.	Δm	n	S.A.	Δm	n
20	+ ·06	14	32	− ·08	3
21	+ ·20	17	33	+ ·18	4
22	+ ·27	18	34	+ ·29	11
23	+ ·40	16	35	+ ·18	8
24	+ ·32	32	36	− ·14	15
25	− ·01	30	37	+ ·15	25
26	+ ·20	24	38	+ ·13	21
27	+ ·39	20	39	− ·13	41
28	+ ·41	16	40	+ ·16	41
29	+ ·37	21	41	+ ·31	34
30	+ ·30	8	42	+ ·24	31
31	+ ·52	11	43	+ ·04	29

These differences do not form a smooth function of the right ascension and if they are considered as accidental, their mean dispersion is found to be ± ·18. A part of these differences must no doubt be attributed to the *Bergedorf-Groningen Durchmusterung*, but as few details about the zeropoint errors are given in its introduction the effects of the two catalogues can not well be separated. In view of the large corrections which were applied by BELJAWSKY for different parts of the zone it seems likely that his catalogue is not homogeneous with regard to zeropoint.

[1]) *Poulkovo Bull.* **6**, No. 72, 263, 1915.
[2]) *Mt W. Contr.* No. 489, 1934; *Ap. J.* **79** 203, 1934.
[3]) *B.A.N.* **6**, 69, 1930.